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(56) Documents cited
GB 2176862 A GB 2121903 A GB 1546254 A
WO 83/03450 A

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Online databases: WPI

(54) A wedge-chuck connector

(57) A wedge-chuck connector for a steel bar splice, eg for reinforcing bars, comprising an internally threaded outer bushing 10, two externally threaded inner bushings 20 and a set of wedge-shaped claws 30 for each inner bushing. A steel bar end 50 is inserted in an inner bushing and clamped tightly within the bushing 10 by means of the claws 30 and correspondingly tapered bore of the inner bushings. Another steel bar end 50 is also assembled in same manner. In another embodiment of the splicer, an externally threaded double-end bolt is used to replace the outer bushing and a pair of internally threaded bushings are screwed thereon to obtain the same splicing result.

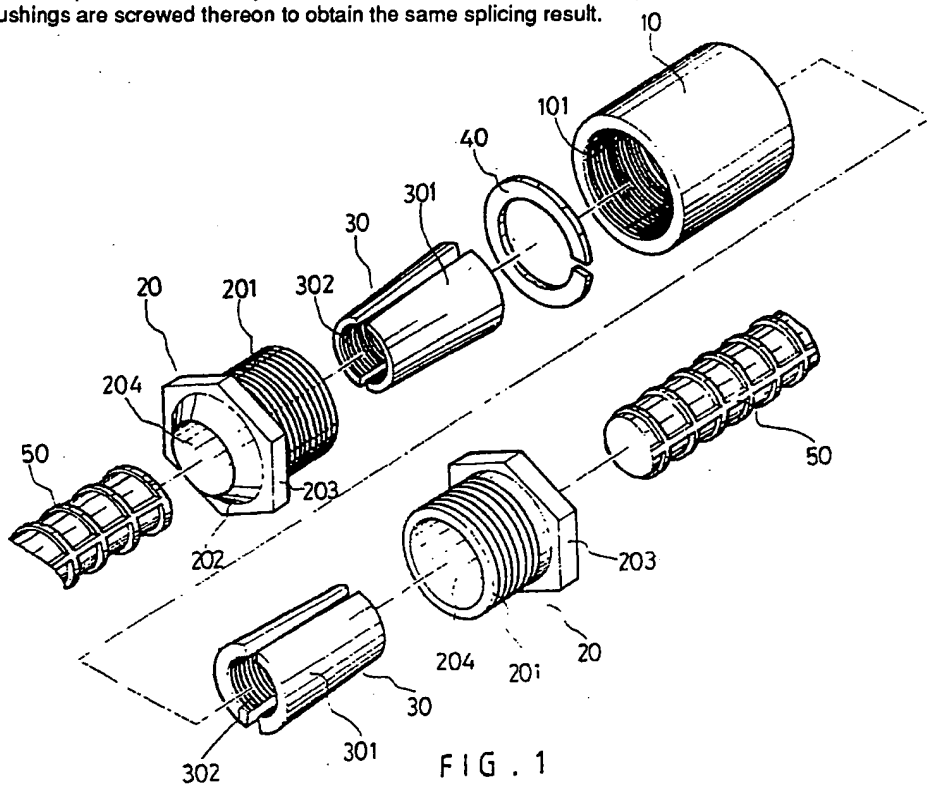

FIG. 1

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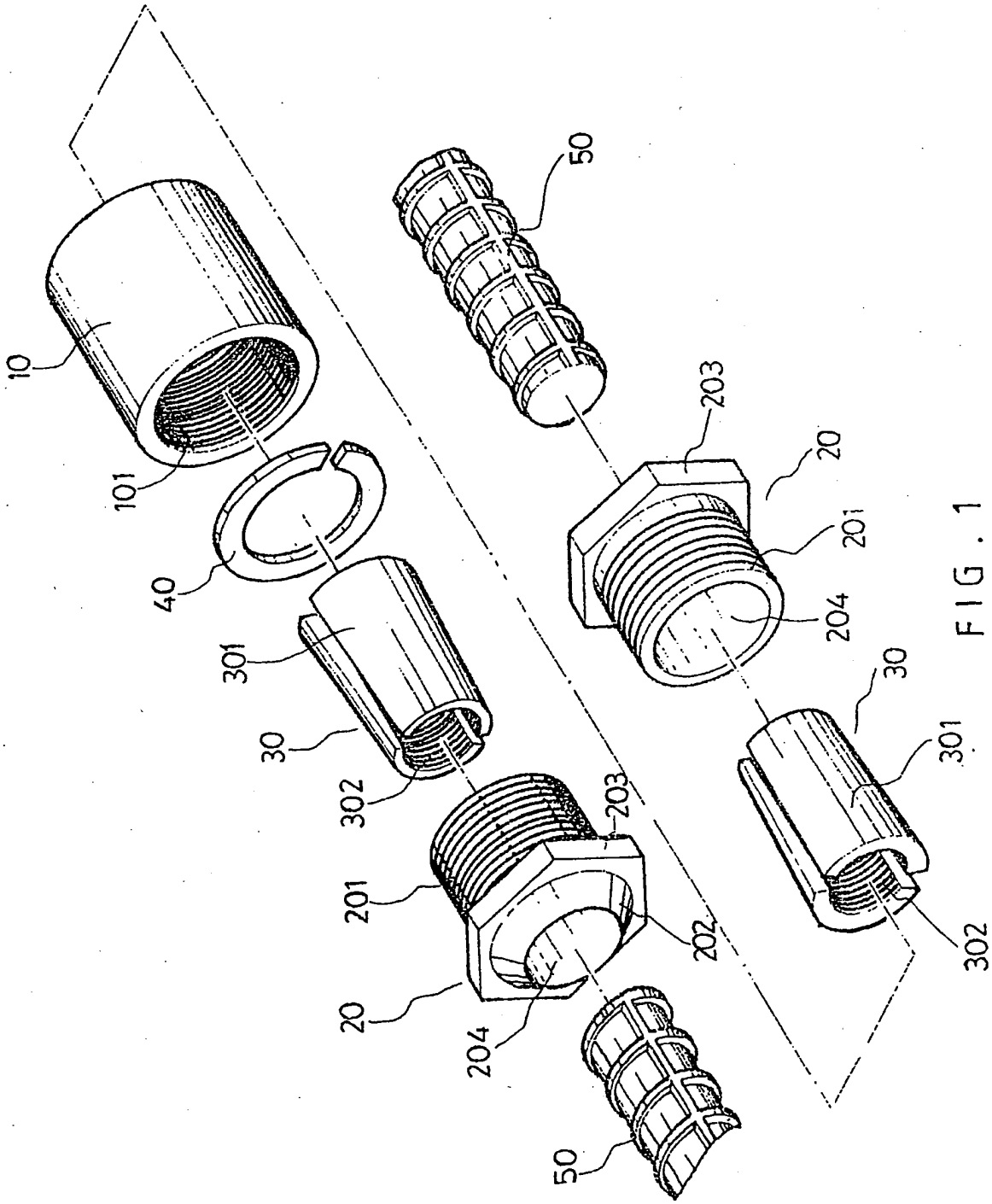
10
101
40
301
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302
201
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50
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FIG. 1

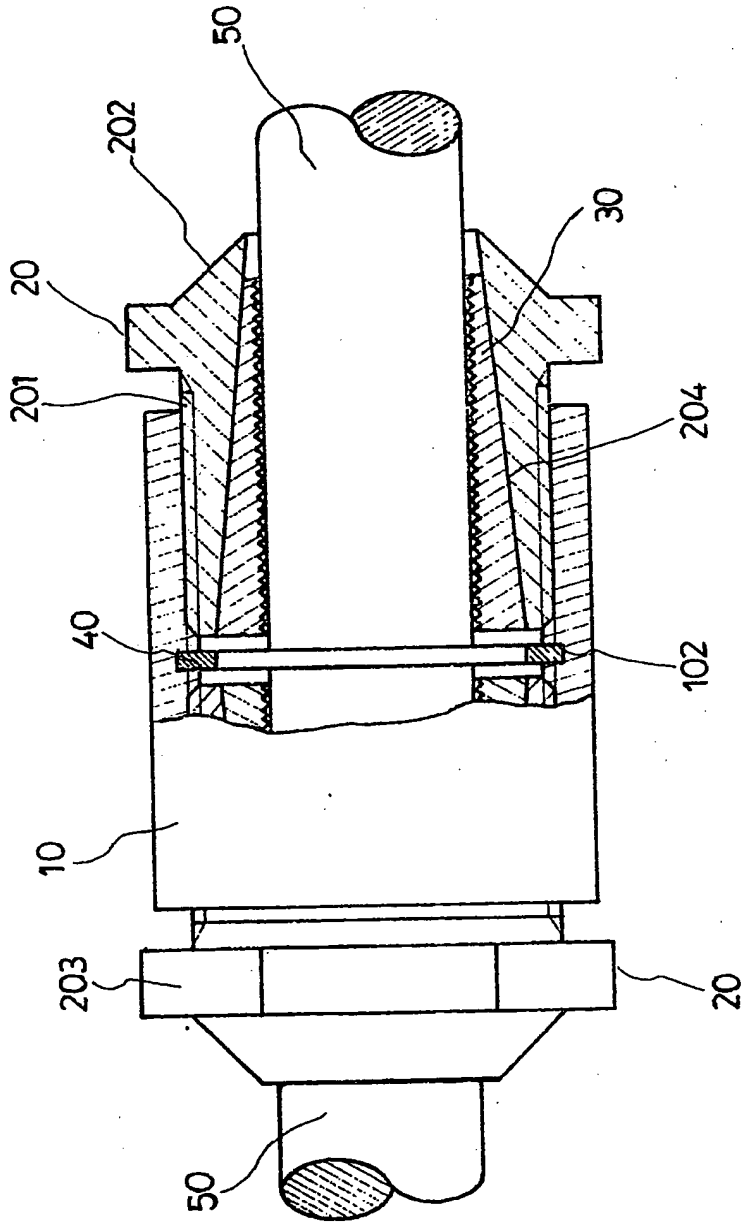

FIG. 2

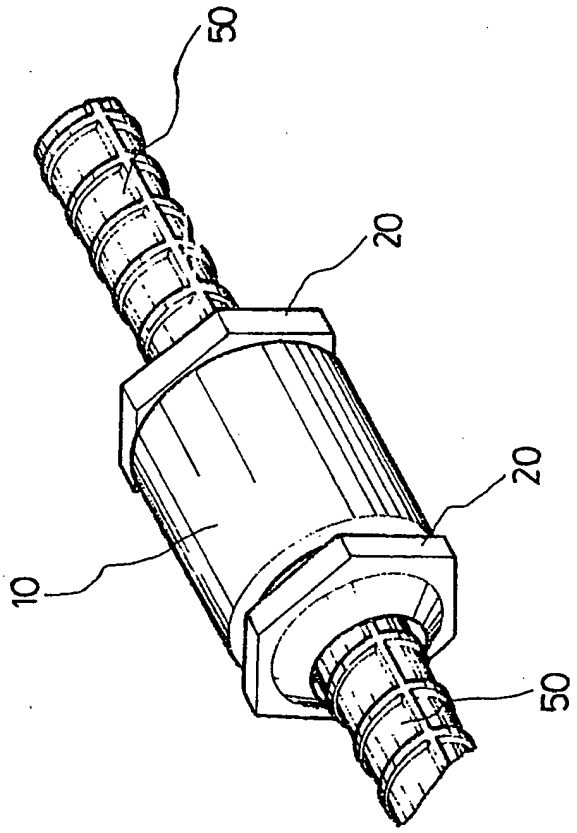

FIG. 3

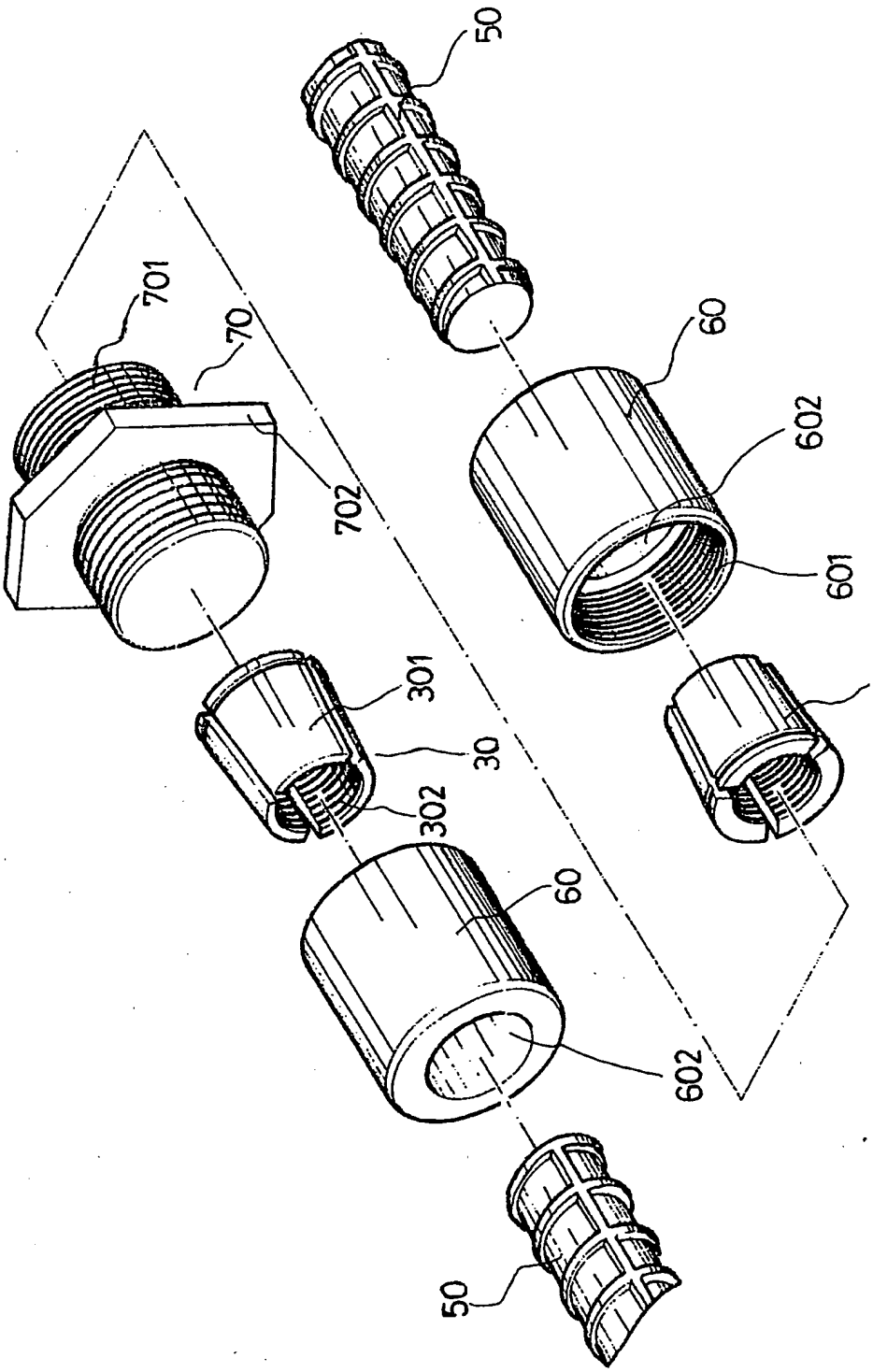

FIG. 4

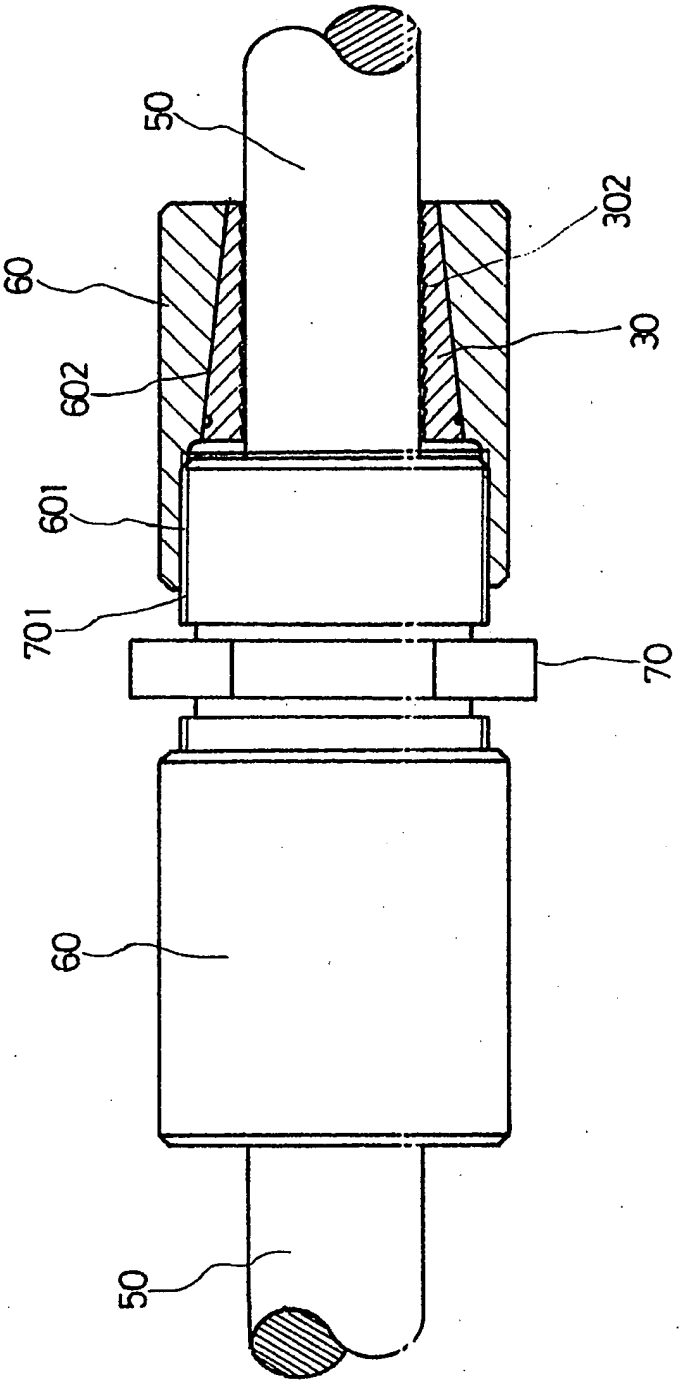

FIG. 5

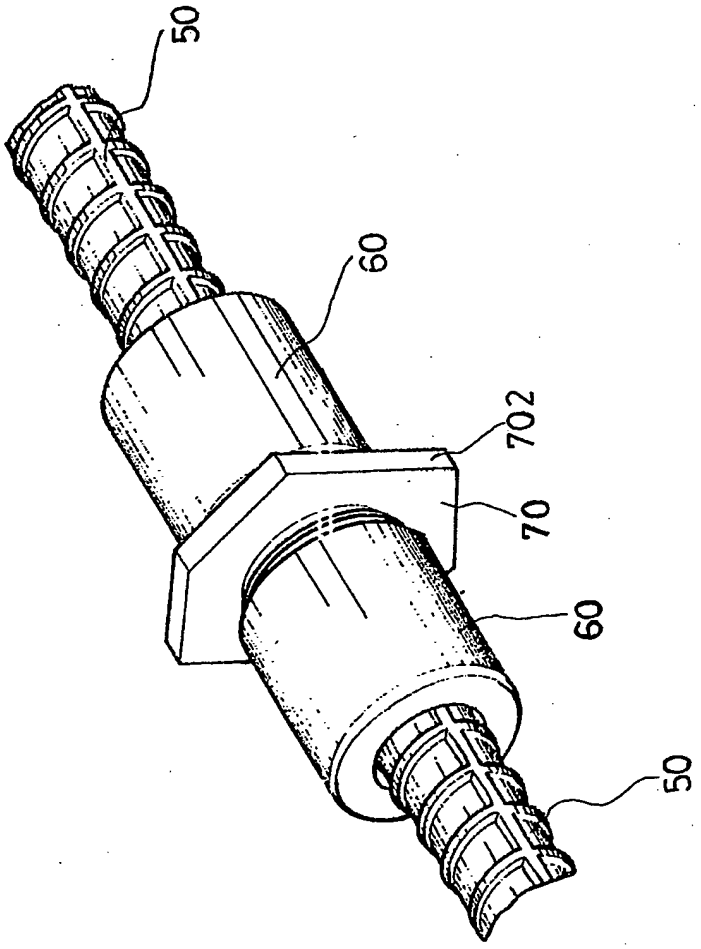

FIG. 6

A Wedge-chuck Connector for Steel Bar Splice

This invention relates to a wedge-chuck connector for steel bar splice.

Generally, whenever a RC (reiuforced concrete) building has a height over five floors, the steel bars therein are required to splice together to increase the strength of the building structure. The traditional method of splicing two steel bars is using pressure gas welding. However, such welding method requires a lot of equipment; it would be much cumbersome to conduct a welding method for steel bars on a high building and it is particularly true in a raining day. Other methods, such as using gas (oxygen and acetylene) welding, or electrical arc welding, would not provide better strength desired. As a whole, all the aforesaid welding methods would cause a change in the metallurgical structure of the joined part of steel bars, i.e., the splicing quality is rather difficult to control. Therefore, these conventional welding methods have been adopted seldom nowadays.

There is a mechanical splicing apparatus, in which thread splicing is the most popular method. Usually, two ends of two steel bars to be connected are turning with a taper threads on the ends; then, the two ends are screwed in a pipe with threads inside. However, the cross sectional area of the

steel bars would be reduced due to the cutted threads; further, since the threads would form many V-shaped grooves on the steel bar to result stress concentration and break later. Another mechanical splicing method is using hydraulic squeezing. The operation steps are that two ends of two steel bars to be connected are inserted into a round pipe, and then the round pipe is squeezed with a hydraulic squeezer so as to let the pipe tightly grip the two steel bars together. However, such splicing method has a drawback to a steel bar having slanting corrugated surface, for such steel bar is hardly gripped firmly. The hydraulic machine would also cause operation difficulty in a high work site.

This invention relates to a wedge-chuck connector for steel bar splice, which comprises an outer bushing, two inner bushinges, and a set of wedge-shaped claws. Each set of the wedge-shaped claws may consist of four pieces or six pieces in accordance with the size of steel bar. The wedge-shaped claws would closely grip the steel bar surface as a result of the taper hole of the inner bushing. Upon the two steel bar ends being mounted with the aforesaid inner bushings, the whole assembly is screwed into the outer bushing until two steel bars being spliced tightly.

The prime feature of the present in-vention is to provide a steel bar splicer, which would hardly reduce the sectional area of a steel bar so as to avaid of breaking. As

a result of the preloading compression force provided by the wedge-shaped claws and the taper holes of the inner bushings, the steel bars spliced would have higher tensile strength to resist a tensile force. Also, the spliced portion would not break upon being pulled in comparison with the other portion of a steel bar; such feature has been tested repeatedly, i.e., the broken portion is usually taken place at a spot far away from the spliced part of a steel bar. Another feature of the present in-vention is to provide a steel bar splicer, in which the inner bushings and the outer bushing have been processed with heat treatments, and their strength can be controlled accurately; the whole splicer would not be broken before steel bar broken.

A further feature of the present invention is the inner bushings would have two steel bars tightly contacted together after being screwed into the outer bushing Therefore, the spliced part of two steel bars can also resist higher compression force than other parts thereof.

An embodiment of this invention is described by way of example with reference to the drawings, in which:

FIG.1 is a disassembled view of an embodiment according to the present invention.

FIG.2 is a sectional view of the present invention.

FIG.3 is a perspective view of the present invention.

FIG.4 is a disassembled view of embodiment-2 according

to the present invention.

FIG.5 is a sectional view of embodiment-2 according to the present invention.

FIG.6 is a perspective view of embodiment-2 according to the present invention.

Referring to FIG.1, there is shown a disassembled view of an embodiment of the present invention, which comprises an outer bushing 10, two inner bushings 20, and four or six pieces wedge-shaped claws 30. The outer bushing 10 is substantially a cylinder with an inner threaded hole 101; the mid-portion of the inner threaded hole 101 has a circular groove 102 as shown in FIG.2. One end of each of the inner bushings 20 is provided with outer threads 201, while the other end of the inner cylinder 20 has a cone 202, a hexagonal flange 203, and a taper hole 204 therein. Each set of the wedge-shaped claws 30 consists of four or six pieces. The inner surface of each claw is provided with threads 302.

FIG.2 is a sectional view of the present invention. Before two pieces of steel bars are spliced, the ends of the steel bars to be spliced have to be cut into a flat surface; the surface of a steel bar is cut to form shallow threads on the corrugated surfaces of the steel bar with a special tool; then, the shallow threaded portion of the steel bar. is covered with wedge-shaped claws 30,and then the inner bushing is pushed to force the wedge-shaped claws 30 fastened in the

taper hole 204 of the inner bushing. Knock the rear end of the inner bushing 20 slightly as to let the taper hole 204 press the wedge-shaped claws 30 and the steel bar 50 closely and tightly together. Finally, the inner bushings 20 filled with a steel bar is mounted in the outer bushing 10 by means of their outer threads and inner threads respectively to complete the splicing operation as shown in FIG.3. Screw the inner bushings 20 outside the outer bushing with force so as to have the steel bars covered with the wedge-shaped claws 30 contacted each other tightly. In such case, the two steel bars would not be disengaged and separated each other upon tension or compression force, and there is preloading compression stress. The wedge-shaped claws 30 would also not lose their gripping force. A C-shaped ring 40 is to be mounted in a circular groove 102 inside the outer bushing 10 for the purpose of positioning the first inner bushing to be inserted into outer bushing without measuring (the c-shaped ring 40 may also be omitted).

Referring to FIG.4, there illustrates embodiment-2 according to the present invention, which comprises four or six pieces of wedge-shaped claws 30, two bushings 60, and a bi-threaded-end bolt 70. The bushings 60 and the bi-threaded-end bolt 70 are used to replace the aforesaid outer bushing 10 and the inner bushings 20. The bushings 60 are substantially a round cylinder, of which one end has an inner

thread hole 601, while the other end thereof has a taper hole 602. Each of the connector contains four pieces or six pieces of wedge-shaped claws 30. The bi-threaded-end bolt 70 has outer threads 701 on both ends thereof, and a hexagonal flange 702 in the mid-part thereof.

FIG.5 is a sectional view of the embodiment-2 of the present invention. The assembly procedures are as follows: Before two steel bars are spliced, cut both ends of the two steel bars with the same method as applied to the aforesaid embodiment, and then put the steel bars 50 in the bushing 60, and attach the wedge-shaped claws 30 around the shallow thread portion of the steel bar. Push the bushing 60 outwards to have the wedge-shaped claws 30 fastened in the taper hole 602 of the bushing so as to force the taper hole 602 closely and tightly in contact with the wedge-shaped claws 30 and the steel bars 50. Finally, mount the bushing 60 around the bi-threaded- end bolt 70 by means of the inner threaded hole 601 and the outer threads 701 thereof, and the steel bars 50 would be spliced closely together as shown in FIG.6.

According to ACI regulations, the strength of the spliced portion must be over by 25% of the yield strength of the steel bar. Many strength tests have been made with the splicer of the present invention, and it shows a 50% of strength over the yield strength of the steel bar, while the broken spot always took place beyond the spliced portion of

steel bars. Therefore, the present invention is deemed a novel disclosure.

CLAIMS

1. A wedge-chuck connector for steel bar splice comprising:

an outer bushing being a round cylinder in shape, having an inner threaded hole;

a set of wedge-shaped claws, each consists of four pieces or six pieces, and the inner surface of each said piece being furnished with threads, while the outer surface thereof being in a taper shape;

an inner bushing having outer threads and a taper hole; and the taper hole of said inner bushing being mounted around said wedge-shaped claws so as to force wedge-shaped claws to grip a steel bar therein tightly, and then said inner bushing being screwed in said outer bushing by means of said outer threads and said inner thread hole to complete a splicing operation of two steel bars.

2. A wedge-chuck connector for steel bar splice as claimed in claim 1, wherein said outer bushing and said inner bushings can be replaced with a bi-threaded-end bolt and bushing, of which one end has an inner thread hole; while the other end has a taper hole and said bi-threaded-end bolt having a hexagonal flange in the mid-portion thereof, and having outer threads on both ends thereof; and said taper hole of said bushing being mounted around said wedge-shaped

claws to force said wedge-shaped claws to grip a steel bar tightly, and then two steel bars mounted with two said bushings being screwed together with said bi-threaded-end bolt tightly so as to have two steel bars spliced together.

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Patents Act 1977
Examiner's report to the Comptroller under Section 17 (The Search Report)

Application number 9109480.5

Relevant Technical fields

(i) UK Cl (Edition) F2M

(ii) Int Cl (Edition) F16B

Search Examiner

G. HEMSLEY

Databases (see over)

(i) UK Patent Office

(ii) Online databases: WPI

Date of Search

25 June 1991

Documents considered relevant following a search in respect of claims 1,2

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
Y	GB 2121903 A (YNGVE)	1
Y	GB 2176862 A (CLABER)	2
Y	GB 1546254 (B.S.)	1,2
Y	WO 83/03450 (AUTOTECHNICS)	1

SF2(p)

SJAABI

Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

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